

PREDICTING DUI RECIDIVISM
VOLUME 2
THE INCREMENTAL UTILITY OF
NON-DRIVER RECORD FACTORS

By
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JULY 1996

Research and Development Branch
Division of Program and Policy Administration
California Department of Motor Vehicles
RSS-96-164

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE July 1996		3. REPORT TYPE AND DATES COVERED
4. TITLE AND SUBTITLE Predicting DUI Recidivism. Volume 2: The Incremental Utility of Non-Driver Record Factors			5. FUNDING NUMBERS	
6. AUTHOR(S) Leonard A. Marowitz				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) California Department of Motor Vehicles Research and Development Section P.O. Box 932382 Sacramento, CA 94232-3820			8. PERFORMING ORGANIZATION REPORT NUMBER RSS-96-164	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) <p>This study determined if factors not available on the driver record are significant predictors of DUI recidivism in the presence of factors found on the driver record. The first substudy focused on alcohol assessment factors, while the second substudy focused on demographic and life-style factors. Alcohol assessment factors, including the MAST and CAGE tests, and the interviewer's assessment of alcohol dependency, were not found to be significant predictors of 1-year DUI recidivism, while some demographic factors were found to be significant predictors. DUI recidivism was found to decrease with increasing years of education and with being employed full-time, while it increased with the number of prior alcohol or drug treatment experiences and being on active military duty status. Each substudy identified driver record factors which were also significant predictors of 1-year DUI recidivism.</p> <p>These findings lead to the conclusion that, for the samples studied, driver record and demographic factors are more important than psychometric assessment factors in predicting DUI recidivism. Possible reasons for this include (1) the wider array of phenomena represented by life-history and demographic variables, (2) the presence of underlying psychological and behavioral tendencies which are manifest in parallel ways in many aspects of an individual's life, and (3) the fallibility inherent in most psychometric instruments.</p>				
14. SUBJECT TERMS			15. NUMBER OF PAGES 36	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

PREFACE

This report is the second volume of a two volume report entitled *Predicting DUI Recidivism*. The report is issued as an internal monograph of the Department of Motor Vehicles' Research and Development Branch. The opinions, findings and conclusions expressed in the report are those of the author and not necessarily those of the State of California.

ACKNOWLEDGMENTS

The author wishes to acknowledge and extend appreciation to the individuals who contributed to this study. Raymond C. Peck, Chief of the Research and Development Branch, provided general direction and guidance, particularly with the statistical analyses. Clifford J. Helander, Manager of the Alcohol and Drug Research Section, provided ongoing direction and helped to assure that the study had a coherent and unified focus. The above individuals reviewed report drafts and offered valuable input on both content and style.

Helen N. Tashima, Research Analyst II, provided general assistance with computer programs which extract data from DMV's driver record file and ensured that the data analyzed validly reflected the contents of DMV's records. William C. Marsh, Research Program Specialist II, assisted with a statistical analysis. Debbie McKenzie, Associate Governmental Program Analyst, prepared the final document and ensured that its format was consistent and clear.

The author is greatly indebted to the El Cajon Municipal Court, and especially Frederick W. Lear, Court Administrator, and Dan Hereford, El Cajon Municipal Court Substance Abuse Assessment Unit Assessor II, for providing data used in this study. The author is also greatly indebted to the San Diego County Department of Health Services, Alcohol and Drug Services, especially Al Medina, Alcohol and Drug Program Administrator, and Lyle Personette, Alcohol and Drug Program Specialist II, for providing data used in this study. The cooperation of these organizations and individuals made this study possible.

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EXECUTIVE SUMMARY

Background

- The purpose of this study is to determine if factors not found on the driver record are significant predictors of driving under the influence (DUI) recidivism in the presence of factors found on the driver record.

- Non-driver record factors of two types, each from a different source, are analyzed.
 1. The first type of factor is related to the assessment of alcohol dependency. The data were provided by the Substance Abuse Assessment Unit of the Municipal Court of El Cajon, California.
 2. The second type of factor is related to demographic and life-style factors. The data were provided by San Diego County (California) Alcohol and Drug Services.

Research Methods: El Cajon Substudy

- Subjects were drivers arrested for DUI who were arrested and sentenced in El Cajon Municipal Court between July 1992 and December 1993. They complied with the court ordered assessment and all data fields necessary for the study were obtainable.
- As part of their sentence, subjects were required to have an assessment of their alcohol and drug problems performed by the Substance Abuse Assessment Unit of the El Cajon Municipal Court. MAST and CAGE assessment instruments were used, and assessment interviews were conducted to assist in identifying the most effective program for preventing a recurrence.
- One-year pre-arrest and post-arrest periods were used.
- Nine independent variables were drawn from the DMV driver record and eight (including BAC) were drawn from the El Cajon Substance Abuse Assessment Unit record.
- The dependent variable was the occurrence or not of a DUI incident (had-been-drinking (HBD) accident or DUI conviction) during the year after the reference DUI arrest.
- Logistic regression analysis was used to develop equations predicting the probability that subjects would recidivate during the year following their arrest. The significance of individual variables as well as overall model fit were determined.

Results: El Cajon Substudy

- Neither of the psychometric variables (MAST and CAGE) nor the clinician's assessment of alcohol dependence were predictive of DUI recidivism.
- Of all the variables, only prior 1-year total convictions was found to be a significant predictor of 1-year DUI recidivism, while gender was almost significant. Each 1-year total conviction was associated with a 52.5% increase in the odds of recidivating, and being male was associated with a 90.5% increase in recidivism likelihood. BAC level was not a significant predictor in any of the equations.

Research Methods: San Diego Substudy

- Subjects were drivers who were arrested for DUI in San Diego County between July 1992 and December 1993, subsequently convicted, and sentenced to licensed DUI programs. They enrolled in a licensed DUI program, and all data fields necessary for the study were obtainable.
- During the licensed DUI program orientation, subjects provided written, self-reported information in a group setting which was later reviewed in an individual session with an intake counselor.
- Data were collected from individual licensed DUI programs and compiled by the San Diego County Alcohol and Drug Services.
- One-year pre- and post-arrest periods were used.
- Ten independent variables (including BAC) were drawn from the DMV driver record and 11 were provided by San Diego County.
- The dependent variable was the occurrence or not of a DUI incident (HBD) accident or DUI conviction) during the year after the reference DUI arrest.
- Logistic regression analysis was used to develop equations predicting the probability that subjects would recidivate during the year following their arrest. The significance of individual variables as well as overall model fit were determined.

Results: San Diego Substudy

- Several variables obtained from the DMV driver record (prior 7-year DUI convictions, prior 1-year total convictions, BAC, age, and gender) and four variables obtained from San Diego County (education, active military duty or not, employed full-time or not, and prior alcohol or drug treatment) were significant or marginally significant predictors in the final recidivism model.
- For DMV driver record variables, each prior 1-year total conviction was associated with a 26.9% increase in the odds of recidivating, each 0.01% increase in BAC with a 5.4% increase in recidivism, and being male with a 57.5% increase. Each year of age was associated with a 2.1% decrease in the odds of recidivating.
- For demographic and life-style variables supplied by San Diego County, offenders in the military were 2.86 (186%) times as likely to reoffend than non-military offenders. Offenders employed full-time versus part-time or unemployed were associated with a 37.6% decrease in the odds of recidivism. A history of treatment for alcohol or drug abuse was also related to recidivism with each additional treatment associated with a 43.7% increase in the odds of recidivating.

Conclusions

- The study had a number of limitations which preclude generalizing the results beyond the local universes sampled (El Cajon and San Diego). These limitations

include much lower percentages of reoffenders and males than seen statewide, which would be expected to bias the samples toward lower probability recidivators. In addition to regional demographic differences, this may have resulted from the 4.1% no-show rate for court ordered assessment reported by El Cajon and the 15% of convictees who did not enroll in licensed DUI programs in San Diego County.

- Additional limitations are the short pre- and post-arrest periods. Longer pre- and post-arrest periods of three and five years, respectively, would lead to better prediction models as more pre- and post-events have an opportunity to occur.
- The findings lead to the conclusion that, for the samples studied, driver record, demographic, and life-style factors are more important than psychometric test variables as predictors of DUI recidivism. The finding that a factor does or does not predict DUI recidivism does not necessarily mean that the factor has no value in improving the programs impact or subsequent recidivism.
- Reasons for the superiority of demographic and life-style factors include the diversity of the phenomena that they represent and the manifestation of similar behavioral characteristics in different aspects of an individual's life.
- The fallibility inherent in most psychometric instruments limits their usefulness in predicting DUI recidivism.
- It is important to distinguish the objective of the study from that of determining whether the treatment programs which collect and use such information are effective in reducing the subsequent rate of impaired driving. This latter objective was not addressed in the study, and the effectiveness or ineffectiveness of the treatment programs is not inferable from an analysis of recidivism correlates.

Policy Implications

- The alcohol assessment instruments evaluated in this study should not be used by the Department in any programs that are based on the identification of likely recidivists. No other alcohol assessment instruments should be used for such purposes until their ability to predict DUI recidivism has been proven through scientific study.
- The demographic and life-style factors assessed in this study may have value for DUI treatment programs in identifying individuals having a higher risk of recidivism. The study results are not sufficiently positive, however, to justify the use of these factors by the Department in taking licensing actions.

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INTRODUCTION

Purpose of the Study

The purpose of Volume 2 of this study is to determine if factors not found on the driver record are significant predictors of driving under the influence (DUI) recidivism in the presence of factors found on the driver record. Such factors may contain unique information associated with the propensity of DUI offenders to recidivate that might not be found in the driver record. Conversely, such non-driver record factors may contain little information associated with DUI recidivism, or may contain information that already is more fully contained in the driving record factors. Only when unique information is contained in non-driver record factors would they be of utility in predicting DUI recidivism.

This study examines non-driver record factors of two types, each from a different source. The first type of factor is related to the assessment of alcohol dependency. The data source is the Substance Abuse Assessment Unit of the Municipal Court of El Cajon, California, a city with a population of about 40,000 in San Diego County. The purpose of this part of the study is to determine if the findings of assessments for alcohol dependency among DUI convictees aid in predicting DUI recidivism, when used in conjunction with driver history. These assessments are designed to differentiate individuals by their dependency on alcohol and may tap into an area of variability among DUI convictees that driver record factors, alone, do not reveal. The courts of El Cajon use two such assessment instruments, the Michigan Alcohol Screening Test (MAST) and the CAGE Test¹. These instruments, along with the assessment of the staff member performing the evaluation of the convictee's alcohol dependency level (none, possible, or definite), were used in this study.

The second type of factor includes self-reported demographic variables related to race, language, marital status, dependents, employment status, income, education, and military service. This information was compiled by the San Diego County Alcohol and Drug Services from data submitted by licensed DUI programs in the county. The purpose of this part of the study is to determine if the compiled demographic factors aid in predicting DUI recidivism, when used in conjunction with driver history. These demographic factors differentiate among individuals and may tap into areas of variability among DUI convictees that factors found on the driver record, alone, do not reveal.

It should be emphasized that this study does not evaluate the efficacy of the El Cajon Substance Abuse Assessment Unit program, the licensed DUI programs in San Diego County, or the San Diego County Alcohol and Drug Services program. Such evaluations would require separate studies. In addition, analysis of specific predictors of DUI recidivism is not equivalent to program evaluation, and the finding that any specific predictor is significant or nonsignificant in predicting DUI recidivism is not an evaluation of the utility of the program or of that factor's utility to the program.

¹ The CAGE acronym is derived from the first letter of a keyword from each of the test's four questions.

Prior Studies Evaluating Factors Not Found on the Driver Record

Epperson, Harano, and Peck (1975) reported that the best indicators of problem drinking driving are the blood alcohol concentration (BAC) at arrest, the number of prior DUI offenses, and two alcohol assessment instruments, the MAST and the Mortimer-Filkins Test.

Moskowitz, Walker, and Gomber (1979), in a review of the literature on DUI offender characteristics, cited the following demographic factors as more likely among DUI convictees: being divorced, separated, or widowed, being unemployed, having lower status occupations, having lower incomes, having a history of prior alcohol treatment, having fewer years of education, and disproportionately being Black or Hispanic.

Popkin, Kannenberg, Lacey, and Waller (1988) evaluated instruments used to assess alcohol abuse in DUI offenders. They concluded that the major usefulness of the CAGE is as a simple, inexpensive, non-threatening screening instrument. The authors stated that the MAST was easy and inexpensive to use, but easily faked by anyone trying to look either “too good” or “too bad,” and useful only in detecting persons who acknowledge having a drinking problem. The authors felt that the MAST is useful as long as its limitations are recognized, and that it should be used only in conjunction with an interview by a counselor.

Peck, Arstein-Kerslake, and Helander (1994) assessed the extent to which DUI recidivism could be predicted from a combination of driver record, criminal record, and licensed DUI program intake interview variables. Recidivists were predicted to be single or divorced, have blue-collar occupations, be ethnic minorities, have a more serious alcohol problem diagnosis by an intake counselor, have exhibited negative attitudes during the intake interview, and have more arrests for malicious mischief and crimes of aggression. Predictors found on the driver record included being younger, having more prior DUI and reckless driving offenses, having more nonalcohol moving traffic violations, being male, having more nonmoving traffic violations, having higher BAC levels, and having more single vehicle and alcohol-related accidents.

Goals of the Study

DUI convictees who are highly dependent on alcohol would be expected to have an increased likelihood of recidivating because they drink frequently and heavily. Identifying these individuals and predicting their likelihood of recidivating would be very much in the interest of traffic safety.

It is not clear if driver history variables such as BAC level at arrest and number of prior DUI convictions are sensitive measures of an individual’s alcohol dependency. Scores on the MAST and CAGE instruments, which assess overall alcohol dependency, may measure differences among DUI convictees not accounted for in equations using only factors related to driver history to predict recidivism. A goal of this study is to determine if these assessment instruments, along with the assessor’s evaluation of the level of alcohol dependency, increase prediction accuracy by accounting for previously unaccounted for variance.

Identifying demographic factors which predispose DUI convictees to recidivate might cast some light on what causes motorists to drink and drive repeatedly. A goal of this

study is identify these factors and to determine the extent to which they are useful in predicting DUI recidivism.

While there is evidence that some demographic factors are significant predictors of DUI recidivism, there is a need to further clarify what these factors are and to compare the current findings with those of prior studies.

METHODS: El Cajon

Subjects

Subjects were drivers arrested for DUI who were sentenced in El Cajon, California Municipal Court during the 18-month period from July 1992 through December 1993. They also met the following conditions:

- El Cajon treatment assessment record contained a valid driver license number, or license number could be obtained from DMV driver record file by automated name index matching.
- Violation date could be found in DMV driver record file for sentencing date in El Cajon record.
- Violation also committed between July 1992 and December 1993.
- Complied with court ordered assessment.
- BAC present on El Cajon record or obtainable from DMV driver record file.
- El Cajon record contained no missing data fields for variables used in analysis.

Of the 4,524 potential subjects arrested and convicted in the study period, a total of 2,215 (49.0%) met these conditions and were used in the study. Sample characteristics were as follows:

- **Age:** Mean = 34.5 years. Median = 33 years. Standard deviation = 11.4 years. Interquartile range = 26-41 years. Minimum = 18 years. Maximum = 86 years.
- **Gender:** Male = 82.3%. Female = 17.7%.
- **Offender type:** First offense = 70.9%. Repeat offense = 19.0%. Wet reckless = 10.1%.
- **BAC:** Mean = 0.148%. Median = 0.14%. Standard deviation = 0.052%. InterquartilerRange = 0.11%-0.18%. Minimum = 0.00%. Maximum = 0.47%.
- **Licensed DUI program:** First offender program = 81.5%. Repeat offender (SB 38) Program = 16.5%. No program = 2.0%.
- **Level of apparent alcohol/drug problem²:** None = 52.1%. Possible = 7.2%. Definite = 40.6%.
- **Mast score³:** Mean = 7.6. Median = 4. Standard deviation = 8.5%. Interquartile Range = 2 - 9. Minimum = 0. Maximum = 72.
- **Cage score⁴:** Mean = 0.85. Median = 0. Standard deviation = 1.14. Interquartiler range = 0 - 2. Minimum = 0. Maximum = 4.

² Determined by staff performing assessment.

³ Five or more points = alcoholic. Four points = suggestive of alcoholism. Three points or less = not alcoholic. Minimum possible score = 0. Maximum possible score = 49 plus 2 times each arrest or detention for being under the influence of alcohol.

⁴ Two or three positive answers indicates a high probability of alcohol dependency. Minimum score possible = 0. Maximum score possible = 4.

Design

As part of their sentence for a DUI-related conviction, the subjects were required to have an assessment of their alcohol and drug problems performed by the Substance Abuse Assessment Unit of the El Cajon Municipal Court. Assessment interviews were conducted by one of three trained interviewers. Information used in this study, which was obtained during the interviews, is described above.

Data for all assessments from 1989 through early 1994, which were obtained pursuant to convictions for a wide variety of driving and nondriving offenses, were copied onto diskettes by the El Cajon Municipal Court Substance Abuse Assessment Unit and mailed to the DMV, where it was copied onto mass storage C-tapes for analysis. The final data file which was analyzed contained only DUI-related sentences, as described above.

The violation date preceding the sentencing date was used as a reference date, as long as it fell between July 1992 and December 1993, as described previously. A 1-year pre-arrest period included and ended on the day after the arrest date, while a 1-year post-arrest period began two days after the arrest date (to allow for one day discrepancies in reported arrest dates). Drivers with more than one sentence and violation date during the study period had the first incident serve as the reference event with further incidents being included during the post-arrest period.

The dependent variable used in this study was a DUI incident [had-been-drinking (HBD) accident or DUI conviction] occurring during the year after the entry DUI arrest. This variable had two values: present if at least one DUI incident occurred during the time period and absent if no DUI incidents occurred.

A total of 17 independent variables were used. As described earlier, eight of these variables were largely provided by the El Cajon Municipal Court and were age, gender, offender type, BAC, licensed DUI program, level of apparent alcohol/drug dependency, MAST score, and CAGE score. The remaining independent variables were obtained from the DMV driver file and were prior 1-year counts of total convictions, alcohol/drug/wet reckless major convictions, total accidents, fatal and injury accidents, total California Vehicle Code (CVC) §14601 (driving while suspended or revoked) convictions, negligent operator points, HBD accidents and DUI convictions, as well as prior 7-year DUI convictions.

In order to be consistent with prior work on this project, a third degree polynomial of BAC was used, so BAC^2 and BAC^3 were additional terms in the initial analysis. A main effects model was used with the intention of then using a main effects plus 2-way interactions model if there were several significant main effects.

Statistical Analyses

Logistic regression was used to develop equations to predict whether or not subjects would recidivate during the year following their arrest. Logistic regression analyses were carried out using the actual model syntax, in which the data are entered ungrouped. Forward selection and a significance level to enter the equation of 0.25 were used to choose independent variables for the equations. Once in the equations,

the significance of independent variables was determined by their associated Wald chi-square probabilities.

Overall model fit was assessed using the -2 Log Likelihood (L) statistic, which has a chi-square distribution for the null hypothesis. The p -value for this statistic is also shown. The SAS software LOGISTIC procedure was used (SAS Institute Inc., Version 6, 1990).

Multiple regression was performed on the sample datafile using the SAS software REG procedure to estimate R^2 . The R^2 value was then checked against sample size nomograms (Marowitz, 1991) in order to estimate the probability of detecting an effect of the observed magnitude. Power analyses for logistic regression produced similar estimates of power (Hintze, 1991).

RESULTS: El Cajon

Univariate Measures Obtained from DMV Driver Record File

The mean values and standard deviations of the independent and dependent variables obtained from the DMV driver record file, using the study subjects provided by the El Cajon Municipal Court, are shown in Table 1.

Table 1
Means and Standard Deviations of Variables Obtained from DMV

Variable	Mean	Standard deviation
Prior 1-year total convictions	1.43	0.88
Prior 1-year alcohol/drug or reckless convictions	1.04	0.23
Prior 1-year Total Accidents	0.21	0.44
Prior 1-year Fatal & Injury Accidents	0.09	0.29
Prior 1-year total CVC §14601 convictions	0.09	0.36
Prior 1-year negligent operator points	2.40	1.05
Prior 1-year HBD accidents	0.15	0.36
Prior 1-year DUI convictions	1.04	0.22
Prior 7-year DUI convictions	1.26	0.54
Post 1-year DUI incidents (At Least 1)	0.04*	0.20

*94 post 1-year DUI incidents occurred.

The mean number of occurrences for each variable is small because all, except prior 7-year DUI convictions, were measured for only one year.

Predicting DUI Recidivism with Variables which Assess Alcohol Dependency

Logistic regression models using all independent variables were significant ($p < .05$) whether or not they included the three variables which assess alcohol dependency: alcohol dependency level, MAST score, and CAGE score. Parameters obtained for both these models are shown in Table 2.

Table 2

Logistic Regression Model Statistics Using All Independent Variables,
Excluding or Including Alcohol Dependency Assessment Variables

Parameters	Model excluding alcohol dependency assessment variables	Model including alcohol dependency assessment variables
-2Log <i>L</i> for intercept and covariates*	741.970	739.713
Chi-square for covariates	36.009	38.267
df	16	19
<i>p</i>	0.0029	0.0055

*-2 Log *L* for intercept = 777.979

The slightly smaller value of -2Log *L* for intercept and covariates for the model which includes the assessment variables indicates that this model is a slightly better fit to the data than the model without the assessment variables, but the magnitude of the improvement was not significant. None of the assessment variables were significant ($p > .05$) predictors of recidivism.

Logistic regression using only the three alcohol dependency assessment variables resulted in an overall model that did not significantly improve the model fit ($p > .05$). Again, none of the three variables were significant ($p > .05$) predictors of recidivism. The results are shown in Table 3.

Table 3

Logistic Regression Model Using the Three Alcohol
Dependency Assessment Variables

Variables	Chi-square at entry	Entry sequence	Wald chi- square at end	Pr > chi- square	Final regression coefficients	Odds ratios
Intercept	-----	-----	175.1277	0.0001	-3.1595	0.042
MAST score	2.0355	1	1.3505	0.2452	0.0193	1.019
Level of alcohol dependency	0.1721	2	0.1653	0.6844	-0.0551	0.946
CAGE score	0.0072	3	0.0072	0.9325	0.1249	0.989

-2 Log *L* for intercept = 777.979; -2 Log *L* for intercept and covariates = 775.957; chi-square for covariates = 2.275, *df* = 3, *p* = 0.5172

The MAST and CAGE scores were found to have a significant correlation of .68 ($p = .001$). Correlations were also determined for each of these instruments with the level of alcohol dependency as determined by the assessment interviewer. These correlations were .57 ($p = .0001$) for the MAST and .43 ($p = .0001$) for the CAGE, indicating that the assessment level of alcohol dependency was significantly correlated with both test scores. Thus, although the MAST and CAGE instruments were significantly correlated

with each other and with an interviewer's assessment of alcohol dependency, they were not significant predictors of DUI recidivism.

Logistic Regression Models Developed to Predict DUI Recidivism

Variables which significantly predict recidivism were determined by successive logistic regression analyses. In the first analysis, all available independent variables were used except prior 1-year negligent operator points, because this variable was felt to be redundant to prior 1-year total convictions⁵. Those variables which were found to be significant were used in subsequent analyses. This iterative process led to a model containing only variables which were significant predictors of DUI recidivism.

Seven Independent Variable Model

Logistic regression using 16 independent variables (excluding prior 1-year negligent operator points) plus BAC² and BAC³, with forward entry of $\alpha = .25$, allowed seven variables to enter the model. The overall model was significant ($p < .05$), but, of the seven variables which entered the final equation, only prior 1-year total convictions and prior 1-year fatal and injury accidents were statistically significant ($p < .05$). Four of the five other variables can be considered to have a marginal relationship with recidivism based on $p < .25$, including the MAST score ($p = .09$).

The results of the analysis are shown in Table 4.

Table 4
Logistic Regression Model Using Seven Independent
Variables with Forward Entry Criterion of $\alpha = .25$

Variables	Chi-square at entry	Entry sequence	Wald chi- square at end	Pr > chi- square	Final regression coefficients	Odds ratios
Intercept	-----	-----	97.2010	0.0001	-4.1624	0.016
Prior 1-year total convictions	27.3120	1	15.0083	0.0001	0.3667	1.443
Gender	3.6009	2	3.3534	0.0671	0.6571	1.929
Prior 1-year total VC 14601 convictions	1.7890	3	1.2534	0.2629	0.2235	1.250
Prior 1-year fatal & injury accidents	1.4001	4	4.0474	0.0442	-1.0578	0.347
Prior 1-year total accidents	3.4408	5	3.2448	0.0717	0.4463	1.563
MAST score	1.5116	6	2.8535	0.0912	0.0195	1.020
Offender Type	2.3680	7	2.3634	0.1242	-0.3082	0.735

-2 Log L for intercept = 777.979; -2 Log L for intercept and covariates = 743.069; chi square for covariates = 34.911, $df = 7$, $p = 0.0001$

⁵ A cluster analysis showed that when prior 1-year negligent operator points and prior 1-year total convictions were together in a cluster, prior 1-year total convictions was more representative of the cluster, as indicated by having a lower 1- R^2 ratio. Negligent operator points result from convictions. Negligent operator point count differs from conviction count in proportion to the number of convictions that carry zero or two points. The correlation between the two variables for these data is .71.

Three Independent Variable Model

Another logistic regression was performed using prior 1-year total convictions and prior 1-year fatal and injury accidents, the only independent variables found to be significant in the previous analysis. In addition, gender was included in the model because it was found to be almost significant in the previous analysis. The overall model was significant ($p < .05$), but only prior 1-year total convictions was significant ($p < .05$). Gender again was close to being significant ($p = .07$) but the p value of prior 1-year fatal and injury accidents increased to 0.24.

The results of this analysis are presented in Table 5.

Table 5
Logistic Regression Model Using Three Independent Variables

Variables	Chi-square at entry	Entry sequence	Wald chi- square at end	Pr > chi- square	Final regression coefficients	Odds ratios
Intercept	-----	-----	136.9673	0.0001	-4.3178	0.013
Prior 1-year total convictions	27.3120	1	23.8368	0.0001	0.4221	1.525
Gender	3.6009	2	3.2619	0.0709	0.6447	1.905
Prior 1-year fatal & injury accidents	1.4391	3	1.4045	0.2360	-0.5527	0.575

-2Log L for intercept = 777.979; -2Log L for intercept and covariates = 751.382, Chi-square for covariates = 26.567, $df = 3$, $p = 0.0001$

The successive application of logistic regression to the data showed that prior 1-year total convictions is by far the strongest predictor of DUI recidivism in the El Cajon sample. Gender, prior accidents, and MAST score had marginal relationships to recidivism in some of the equations ($p \leq .10$). Each prior 1-year total conviction increases the odds of recidivism by 52.5%.

Relative Predictive Power of All Models

All models were compared using the Akaike Information Criterion (AIC)⁶, which adjusts the -2 Log L statistic for the number of terms in the model and the number of observations used. AIC values for models containing predictive factors are shown in Table 6 along with the value for the intercept alone model (zero slope). Lower values indicate a better fit.

⁶ AIC = -2 Log L + 2($k + s$), where k = number of ordered values for the response and s = number of explanatory variables.

Table 6

Comparison of Model Fit Using the Akaike Information Criterion (AIC)

Model	AIC value	Rank as to fit	Significance level
Intercept only	779.979		
Intercept + factors			
All 17 factors + BAC ² , BAC ³	779.713	4	(<i>p</i> = 0.0055)
All 17 factors, except those assessing alcohol dependency, BAC ² , BAC ³	775.970	3	(<i>p</i> = 0.0029)
Level of alcohol dependency, MAST, & CAGE	783.957	5	(<i>p</i> = 0.5172)
Seven factors	759.069	1	(<i>p</i> = 0.0001)
Three factors	759.382	2	(<i>p</i> = 0.0001)

The best fitting models do not contain the alcohol dependency assessment variables, while the worst fitting model contains only these variables. The three factor model provides a more parsimonious fit than the seven factor model and, for practical purposes, would be the model of choice for predicting DUI recidivism, based on the El Cajon data.

Explanatory Power of Final Model

The final (three factor) model was assessed using the AIC. The AIC value for the intercept alone model (zero slope) was 779.979, while the AIC value for the intercept plus factors model was 759.382. A lower value indicates a better fit.

The relative AIC (AIC_{rel}) of the fitted model⁷ (A_{I+V}) over a model that predicts all subjects at the mean probability of recidivism (A_I) can be estimated using the following formula:

$$AIC_{rel} = (A_I - A_{I+V}) / A_I$$

For this analysis, this formula gives a relative AIC of 0.026, which indicates a very modest fit.

Statistical Power

The statistical power of the final model was estimated for the logistic regression analysis by performing a multiple regression analysis using the same outcome criterion as in the logistic regression analysis. The R^2 value obtained was 0.014. With a sample size of 2215 and $\alpha = .05$, the statistical power to detect an R^2 of 0.014 was greater than .99,

⁷ Fitted model includes intercept plus factors or variables.

indicating that the model has a very high probability of rejecting the null hypothesis of no association with DUI recidivism ($R^2 = 0$).

Power analyses showed the statistical power of all individual factors to be at least .98.

METHODS: San Diego

Subjects

Subjects were drivers who were arrested for DUI in San Diego County during the 18-month period from July 1992 through December 1993, subsequently convicted of the offense, and sentenced to licensed DUI programs.

Subjects also met the following conditions:

- San Diego record contained a valid driver license number.
- Violation date could be found in DMV driver record file for arrest date in San Diego record.
- BAC obtainable from DMV driver record file.
- San Diego record contained no missing data fields for variables used in analysis, except for income which, where missing, was estimated by imputation (as described later).

Of the 11,603 subject records provided by San Diego County Alcohol and Drug Services, a total of 6,215 (53.6%) met these conditions and were used in the study. Sample characteristics were as follows:

- **Age:** Mean = 33.9 years. Median = 32 years. Standard deviation = 10.7 years. Interquartile range = 26-40 years. Minimum = 18 years. Maximum = 91 years.
- **Gender:** Male = 79.8%. Female = 20.2%.
- **BAC:** Mean = 0.146%. Median = 0.14%. Standard deviation = 0.055%. Interquartile range = 0.11%-0.18%. Minimum = 0.00%. Maximum = 0.50%.
- **Prior alcohol or drug treatment (ever):** Yes = 88.5%. No = 11.5%.
- **Dependents:** Mean = 1.15. Median = 0. Standard deviation = 1.54.
- **Monthly income:** Mean = \$1,818. Median = \$1,256. Standard deviation = \$2,046.
- **Education:** Mean = 12.72 years. Median = 12 years. Standard deviation = 3.36 years.
- **Employment status:** Employed full-time = 57.4%. Not employed full-time = 42.6%.
- **Military Status:** Active duty = 1.8%. Not active duty = 98.2%.

Design

As part of their sentence for a DUI-related conviction, subjects were required to attend a licensed DUI program. During the enrollment and orientation process of the licensed DUI programs, participants provided written, self-reported information in a group setting. Information provided was later reviewed in an individual session with an intake counselor.

The data were keypunched and managed by the individual licensed DUI programs and submitted monthly to San Diego County Alcohol and Drug Services on diskette, and

were subjected to a series of validity checks at both the program and county level. Compiled data were put on diskettes by San Diego County Alcohol and Drug Services and mailed to the California DMV, where the diskettes were copied onto mass storage C-tapes for data analysis.

The violation date found in the DMV driver file which agreed with the arrest date on the San Diego record was used as a reference date. A 1-year pre-arrest period included and ended one day after the arrest date, while a 1-year post-arrest period began two days after the arrest date (to allow for one day discrepancies between reported arrest dates). Drivers with more than one violation during the study period had the first incident serve as the reference event with further incidents being included in the post-arrest period.

The dependent variable used in this study was a DUI incident (HBD accident or DUI conviction) occurring during the year after the reference DUI arrest. This variable had two values: present, if at least one DUI incident occurred during the time period, and absent, if no DUI incidents occurred.

A total of 21 independent variables were used in the study. Eleven of these variables were provided by San Diego County and included prior alcohol or drug treatment (yes or no), gender, race/ethnicity, primary language, marital status, number of dependents, employment status, monthly income, years of education, military experience, and age. The remaining ten independent variables were obtained from the DMV driver file and included prior 1-year counts of total convictions, alcohol/drug/wet reckless major convictions, total accidents, fatal and injury accidents, total VC 14601 convictions, negligent operator points, HBD accidents, and DUI convictions, as well as prior 7-year DUI convictions and BAC level at arrest.

In order to be consistent with prior work on this project, a third degree polynomial of BAC was used, so the terms BAC^2 and BAC^3 were additional terms in the initial analysis. Due to nonlinearity found in prior 7-year DUI convictions, prior 7-year DUI convictions squared was used to improve the fit of the final model. A main effects model was used.

Statistical Analyses

Logistic regression was used to develop equations to predict whether or not subjects would recidivate during the year following their arrest. Logistic regression analyses were carried out using the actual model syntax, in which the data are entered ungrouped. Nominal variables were accounted for by systems of dummy variables, each of which created a series of group membership dichotomies (Cohen & Cohen, 1983). Forward selection and a significance level of .25 to enter the equation was used to select independent variables for the models. Once in the equations, the significance of independent variables was determined by their associated Wald chi-square probabilities.

Overall model fit was assessed using the -2 Log Likelihood (L) statistic, which has a chi-square distribution for the null hypothesis. The p -value for this statistic is also shown. The SAS software LOGISTIC procedure was used (SAS Institute Inc., Version 6, 1990).

Values for monthly income were missing from approximately 20% of the 6,215 records analyzed. The missing values were imputed using three sample variables which had significant correlations with income on records containing all these variables. These three variables, employment status, education, and age, were used to develop a multiple regression equation with income as the criterion variable using records containing all these variables. The equation was then used to assign income values to records lacking them. The SAS software REG procedure was used.

Multiple regression was performed on the sample datafile using the SAS software REG procedure to estimate R^2 . The R^2 value was then checked against sample size nomograms (Marowitz, 1991) in order to estimate the probability of detecting an effect of the observed magnitude. Power analyses for logistic regression produced similar estimates of power (Hintze, 1991).

RESULTS: San Diego

Univariate Measures Obtained from DMV Driver File

The mean values and standard deviations of the independent and dependent variables obtained from the DMV driver file, using the study sample of San Diego County Alcohol and Drug Services subjects, are shown in Table 7.

Table 7

Means and Standard Deviations of Variables Obtained from DMV

Variable	Mean	Standard deviation
Prior 1-year total convictions	1.43	0.76
Prior 1-year alcohol/drug or reckless convictions	1.02	0.17
Prior 1-year total accidents	0.19	0.43
Prior 1-year fatal & injury accidents	0.09	0.29
Prior 1-year total VC 14601 convictions	0.04	0.23
Prior 1-year negligent operator points	2.42	0.79
Prior 1-year HBD accidents	0.13	0.34
Prior 1-year DUI convictions	1.02	0.15
Prior 7-year DUI convictions	1.21	0.46
Post 1-year DUI incidents (at least 1)	0.03*	0.18

*200 post 1-year DUI incidents occurred.

The mean number of occurrences for each variable is small because all (except prior 7-year DUI convictions) were measured for only one year.

Logistic Regression Models Developed to Predict DUI Recidivism

The evaluation of nominal predictor variables (race, primary language, marital status, employment status, and military status) as systems of dichotomous variables, using logistic regression, resulted in two dummy variables being found as significant predictors of DUI recidivism after the forced inclusion of all other variables. One of these predictors represented full-time employment status and the other represented active military duty status.

Subsequent logistic regression analyses revealed that offender status (provided by San Diego County) and prior 7-year DUI convictions (provided by DMV) exhibited multicollinearity. Offender status was determined to be a confounded and unreliable variable because some subjects recidivated between their reference arrest and subsequent licensed DUI program admission self-reporting session. Consequently, these individuals reported themselves to San Diego County Alcohol and Drug Services as repeat offenders because of what would have been recidivist events in the study. Thus, the same event would have led to self-determined repeat offender status and been counted as a subsequent DUI event. Because of this, offender status was not used in this study and prior 7-year DUI convictions, which was correlated .87 with offender status, was used instead.

Analysis showed that the relationship between number of prior 7-year DUI convictions and rate of recidivism was quadratic. Therefore, an additional predictive term, prior 7-year DUI convictions squared, was added to the equation. Prior 7-year DUI convictions were truncated to three values, 1, 2, and 3+, and the mean of the truncated value and its square were subtracted from the linear and squared values, respectively, to minimize multicollinearity.

Logistic regression first forced the quadratic polynomial of prior 7-year DUI convictions (i.e., the linear and squared terms) into the equation, and then let all other variables into the model which had a significance level for entry of .25. A total of 21 variables, including BAC² and BAC³, were used and 10 variables entered the model.

The overall model was significant ($p < .05$). Seven variables, including BAC, gender, education, age, prior 1-year total convictions, employed full-time or not, and active duty military or not, were significant ($p < .05$). The linear and squared terms of prior 7-year DUI convictions, as well as prior treatment-ever, all approached significance ($p = .07, .09$, and $.11$, respectively) and were left in the final model, since they all met the significance level for entry criterion.

The results of the analysis are shown in Table 8.

Table 8.
Final Logistic Regression Model

Variables	Chi-square at entry	Entry sequence	Wald chi- square at end	Pr > chi- square	Final regression coefficients	Odds ratios
Intercept	-----	-----	41.1049	0.0001	-4.0676	0.017
Prior 7-year DUI convictions	-----	-----	3.3680	0.0665	-1.8401	0.159
(Prior 7-year DUI convictions) ²	-----	-----	2.8779	0.0898	0.4825	1.620
Education	15.0245	1	10.5070	0.0012	-0.0670	0.935
Prior 1-year total convictions	12.6836	2	9.0437	0.0026	0.2384	1.269
BAC	14.0041	3	16.3021	0.0001	0.0527	1.054
Active duty military or not	9.5402	4	8.4330	0.0037	1.0524	2.864
Employed full-time or not	9.1090	5	10.3667	0.0013	-0.4718	0.624
Age	7.2343	6	7.8605	0.0051	-0.0217	0.979
Gender	4.7573	7	4.4986	0.0339	0.4543	1.575
Prior alcohol or drug treatment-ever	2.5627	8	2.5476	0.1105	0.3623	1.437

-2 Log *L* for intercept = 1768.055; -2 Log *L* for intercept and covariates = 1696.288; chi-square for covariates = 71.767, *df* = 10, *p* = 0.0001

The application of logistic regression to the data shows that BAC is the most significant predictor of 1-year DUI recidivism in the San Diego sample. Each hundredth of a percent increase in BAC level at arrest increases the odds of 1-year DUI recidivism by 5.4%. Large differences in BAC of .10% (e.g., .05% vs. .15%, or .20% vs. .30%) would increase the odds of DUI recidivism by 54%.

Active duty military status was associated with about 2.9 times the probability of 1-year DUI recidivism. Men showed a 57.5% greater probability of DUI recidivism than women, and each prior 1-year traffic conviction increased the odds of recidivism by 26.9%. Each prior alcohol or drug treatment experience, many of which would be associated with prior DUI convictions, increased the odds by 43.7%.

Those employed full-time have only 62.4% as great a chance of 1-year DUI recidivism as those who are not. Each year of education lowers the odds by 6.5% (1 - 0.935), while each year of age lowers the odds by 2.1% (1 - .979).

Explanatory Power of Final Model

The final model was assessed using the Akaike Information Criterion. The AIC value for the intercept alone model (zero slope) was 1770.055, while the AIC value for the intercept plus factors model was 1718.288. A lower value indicates a better fit.

The relative AIC (AIC_{rel}) of the fitted model (A_{I+V}) over a model that predicts all subjects at the mean probability of recidivism (A_I) can be estimated using the following formula:

$$AIC_{rel} = (A_I - A_{I+V}) / A_I$$

For this analysis, this formula gives a relative AIC of 0.029, which indicates that the model fit has very modest explanatory power.

Statistical Power

The statistical power of the final model was estimated for the logistic regression analysis by performing a multiple regression analysis using the same outcome criterion as in the logistic regression analysis. The R^2 value obtained was 0.012⁸. With a sample size of 6,215 and $\alpha = .05$, the statistical power of this analysis was found to be greater than .99, indicating that the model has a very high probability of rejecting the null hypothesis of no association with DUI recidivism ($R^2 = 0$).

Power analyses showed the statistical power of all individual factors to be at least .90.

DISCUSSION AND CONCLUSIONS

Study Limitations

Data from both the El Cajon Municipal Court and San Diego County Alcohol and Drug Services have lower percentages of reoffenders and males than do statewide data for DUI offenders (Tashima & Helander, 1996). Since reoffenders and males recidivate at higher rates than first offenders and females, respectively, this suggests that the samples used in this study may be biased and show lower recidivism rates than does the full population of DUI convictees from which each is drawn.

This possibility is reinforced by 1-year DUI recidivism rates of about 3% for El Cajon subjects and about 4% for San Diego subjects, compared to the statewide rate of about 5% for a similar time period. These lower recidivism rates make causal relationships between predictor variables and criterion measures more difficult to discern because there are fewer subjects whose status as recidivators can be associated with prior events.

The discrepancies between the DUI convictees found in the samples used in this study and a statewide sample may be real and may reflect true differences resulting from program effects. However, the differences may have occurred because the most probable recidivators were disproportionately lost in the creation of the samples. Possible sources of their loss include the 4.1% of El Cajon DUI convictees reported as not showing up for post-conviction assessment and the 15% of San Diego County DUI convictees who did not report to licensed DUI programs. A recent study of reconvicted drinking drivers by Friedman, Harrington, and Higgins (1995) speculated that a substantial proportion of these DUI convictees were basically not inclined to conform with the legal system. It may be that such individuals, who are highly inclined to

⁸ While the AIC explanatory power of the San Diego substudy model is greater than that of the El Cajon substudy model (0.029 vs. 0.026), the R^2 of the San Diego substudy model is less than that of El Cajon (0.012 vs. 0.014). The smaller San Diego model R^2 probably results from greater attenuation due to its smaller mean (0.032 vs. 0.042) and variance (0.031 vs. 0.040) which limit the maximum attainable correlation of the criterion measure with predictor variables (Peck, 1994). This attenuates the size of R^2 , but not of the AIC which is based on likelihood.

recidivate, constitute the bulk of the no-shows, thus biasing the final sample in the direction of individuals with low probabilities to recidivate.

The above findings and speculations suggest that the findings of this study not be generalized to all DUI convictees in El Cajon, San Diego County, or statewide. However, the findings do reflect DUI recidivism and its prediction for the subjects included in the samples. Thus, the El Cajon findings do relate to assessed DUI convictees and the San Diego findings do reflect DUI treatment attendees in San Diego County. It is also probable that the findings can be generalized to DUI convictees attending court mandated assessments and licensed DUI programs statewide. However, it must be emphasized that these individuals are not homogeneous with all DUI convictees and, as a group, are biased toward lower probability recidivators.

An additional limitation of the study is that only one year of pre-arrest driving history (plus 7-year DUI convictions) and one year of post-arrest DUI recidivism measurement were available, due to DMV's annual purge of the driver record. Longer pre- and post-arrest time periods, three years for the former and three to five years for the latter, would lead to better prediction models as more pre- and post-events would have an opportunity to occur.

Accounting for Variance in Predicting DUI Recidivism

Accounting for all sources of variance in DUI recidivism would lead to a perfect prediction equation and the ability to foretell the precise probability of recidivism for each DUI convictee. Like a crystal ball, such an equation is not available nor will it likely be in the foreseeable future. Recognizing this, researchers have sought to find predictors of DUI recidivism from varied sources, including DMV driver records, psychological profiles, alcoholism assessments, criminal histories, demographics, and a variety of biographical correlates which, taken together, describe a modest amount of the variance in DUI recidivism.

This study began with the DMV driver record as its core source of predictive variables, including a cubic polynomial of BAC. In the first part of this study, two alcohol assessment instruments, the MAST and CAGE tests, and the interviewer's assessment of alcohol dependency, were evaluated as predictors along with several other El Cajon-provided variables. None of these were significant predictors of 1-year DUI recidivism, alone or in combination with driver record factors. Of the driver record variables, only prior 1-year total convictions was significant (gender was almost significant). In the second part of this study, a variety of demographic and biographical factors that were available were evaluated. Four of these factors, education, active military duty status, full-time employment status, and prior alcohol or drug treatment, were significant predictors of 1-year DUI recidivism, along with six driver record factors: prior 7-year DUI convictions (linear and squared), prior 1-year total convictions, BAC level at arrest, age, and gender.

What Information Do Predictor Variables Provide?

The El Cajon substudy showed that prior 1-year total convictions is among the strongest available predictors of 1-year DUI recidivism. This finding is consistent with Volume 1 of this study (Marowitz, 1996) which showed that prior 2-year total convictions is a relatively strong predictor of 1-year DUI recidivism. The Volume 1

study, which used an unbiased sample of all statewide DUI convictees, also showed that BAC (cubic polynomial) is a strong predictor of 1-year DUI recidivism, a finding not shared by the El Cajon substudy. The discrepancy may be the result of the bias of the El Cajon sample toward lower probability recidivators, with that bias being related to the BAC level of the subjects. It may also be due to the longer 2-year pre-arrest period in the Volume 1 study in which more events occurred leading to greater inter-subject variability, with BAC becoming a significant factor. When samples were compared, the mean BAC of the Volume 1 study sample was found to be 0.162% ($SD = 0.056\%$), while the mean BAC of the El Cajon study was 0.148% ($SD = 0.052\%$), or about 9% lower in relative terms. The lower mean BAC and standard deviation may explain why BAC level at arrest was not a significant predictor of recidivism in the El Cajon substudy.

The MAST, CAGE, and interviewer's alcohol dependency assessment measures might be thought to account for much of the same variance as contained in prior DUI driving record measures and BAC level at arrest. In the presence of driver record factors, these three alcohol assessments might not be expected to add significant information about DUI recidivism. Yet, it is surprising that these three alcohol assessments were not significant predictors in the absence of driving record variables. However, since BAC level at arrest was not a significant predictor, it may not be remarkable that alcohol dependency measures, which should be related to the amount of alcohol that an individual would consume, are also not significant predictors. BAC level correlated moderately, but significantly, with the MAST ($r = .29$), the CAGE ($r = .25$), and the interviewer's assessment ($r = .45$), giving support to the view that, for the El Cajon sample, alcohol dependency was not a significant predictive factor.

The San Diego County substudy found prior driving convictions, in general and specifically for DUI, as measured by prior 1-year total convictions and prior 7-year DUI convictions, respectively, to be significant predictors of 1-year DUI recidivism. Unexpectedly, 7-year DUI convictions showed a quadratic relationship with 1-year DUI recidivism, indicating that each successive conviction (up to the highest number of 3+) increases the probability of recidivism more than the last conviction increased it. Thus, convictees with three or more DUI recidivist events were highly inclined to recidivate in the San Diego sample, almost four times more so than second offenders.

BAC level at arrest was a significant predictor of 1-year DUI recidivism in the San Diego County substudy. This is in partial agreement with the results of the Volume 1 study in which there was a cubic relationship between BAC and 1-year DUI recidivism. The difference may reflect a bias of the San Diego sample toward lower probability recidivators (as with El Cajon) that is related to the BAC level of the subjects. As with the El Cajon substudy, it may also be due to the longer 2-year pre-arrest period in the Volume 1 study, which allowed more events to occur leading to greater inter-subject variability. The dynamics of the significant relationship between BAC and DUI recidivism may have had enough time to become manifest. When samples were compared, the mean BAC of the Volume 1 study sample was found to be 0.162% ($SD = 0.056\%$), while the mean BAC of the San Diego study was 0.146% ($SD = 0.055\%$), or about 10% lower in relative terms. The lower mean BAC but similar standard deviation for San Diego may explain why BAC level at arrest was significant, but in a less complicated linear manner, in the San Diego substudy than in Volume 1.

The San Diego County substudy also found age and gender to be significant predictors of 1-year DUI recidivism. These findings are consistent with the Volume 1 study and others which have shown younger drivers and males to have higher rates of DUI recidivism.

Data provided by San Diego County showed that 1-year DUI recidivism is inversely related to the number of years of education. This result is consistent with the 1993 National Household Survey on Drug Abuse (National Institute on Drug Abuse, 1995) which found that the use of any alcohol increased with education level, but the heavy use of alcohol generally decreased with education level. The decreased prevalence of heavy alcohol use with higher education level would be expected to be related to decreased DUI recidivism. Peck et al. (1994) reported that the most deviant DUI recidivists were, among other things, typically high school dropouts.

Active military duty status increased the probability of 1-year DUI recidivism by almost three times over all alternates, including never having been in the military or being a veteran. This finding is consistent with the often reported problems of alcohol consumption in the military (Serrano, 1993).

The increased probability found for active duty military in San Diego County is probably slightly less than found by this analysis. This is because in San Diego, only a portion of active duty military personnel convicted of a first offense DUI enroll in state licensed DUI programs. State law allows active duty military to enroll in the Navy's PREVENT program in lieu of attending a licensed first conviction DUI program. The PREVENT program is designed to increase alcohol and drug awareness and build self-esteem for first offenders, and is accepted by the DMV. The PREVENT program estimated that 237 California licensed drivers enrolled in the program for "off base" DUI (20% of all "off base" DUI enrollees) during the study period. If all active duty military "off base" first offenders were enrolled in civilian, state licensed DUI programs and therefore included in the database for this study, the increased percentage of all active duty military who were first offenders would have been higher in this study. First offenders generally have lower rates of recidivism than repeat offenders, so the overall recidivism rate for active duty military would have probably been lower and the increased recidivism due to active duty military status would have been lower. The extent of this decrease was estimated by a subsequent analysis of the recidivism rates of only repeat offenders, thus eliminating any first offender sampling bias. This analysis showed that the recidivism odds ratio due to active duty military status for repeat offenders was 2.452, as opposed to the odds ratio of 2.864 found for all offenders. Thus, it does appear that active duty military status does greatly increase the probability of DUI recidivism.

Full-time employment status decreased the probability of 1-year DUI recidivism by almost 40% over all alternatives, such as being employed part-time or being unemployed. It has long been known that DUI convictees are more likely to be unemployed (Moskowitz, et al., 1979). Full-time employment status leads to financial and possibly emotional stability (although it can be argued that emotional stability leads to full-time employment) which probably would lead to less drinking.

Prior alcohol or drug treatment increased 1-year DUI recidivism by over 40%. Since repeat offenders would have disproportionately attended licensed DUI programs as a result of prior offenses, this measure may be confounded with offender status. Repeat offenders who were tested for BAC were found to have a 14.8% greater probability of recidivating than first offenders (Marowitz, 1996). Thus, the increase in recidivism for those having attended an alcohol or drug program may have been due in part to their being disproportionately repeat offenders and in part to their having histories of alcohol or substance abuse.

Factors found not to be significant predictors of 1-year DUI recidivism in the San Diego County sample were race (Caucasian, African-American, Hispanic, and other), primary language (English, Spanish, and other), marital status (never married, currently married, divorced/separated/widowed, and living as married), number of dependents, and income.

Conclusions

The El Cajon substudy leads to the conclusion that assessments of alcohol dependency using the MAST and CAGE tests, along with interviewer assessments, are not significant predictors of 1-year DUI recidivism for DUI convictees assessed by the El Cajon Municipal Court. These findings do not bear on the utility of these factors to the El Cajon Substance Abuse Assessment Unit in the evaluation of client program needs.

The San Diego substudy leads to the conclusion that, for licensed DUI program attendees, education, active military status, full-time employment status, and prior alcohol or drug treatment are significant predictors of 1-year DUI recidivism.

Together, these findings lead to the conclusion that, for the samples studied, driver record and demographic factors are more important than psychometric assessment factors in predicting DUI recidivism. The superiority of demographic and life style variables over psychometric test variables as predictors of drinking-driving problems has been substantiated by several previous investigators (Arstein-Kerslake & Peck, 1985; Perrine, Peck, & Fell, 1988; Stewart, Epstein, Gruenewald, Laurence, & Roth, 1987). Among the reasons for this finding are (1) the wider array of phenomena represented by life-history and demographic variables, (2) the presence of underlying psychological and behavioral tendencies which are manifest in parallel ways in many aspects of an individual's life, and (3) the fallibility inherent in most psychometric instruments.

Policy Implications

The alcohol assessment instruments evaluated in this study should not be used by the Department in any programs that are based on the identification of likely recidivists, and there is some question as to whether any presently available alcohol assessment instrument can be used to effectively predict DUI recidivism. Studies to date have commented favorably on the psychometric characteristics of some of these tests, but their predictive validity has yet to be evaluated.

In contrast, the demographic and life-style factors assessed in this study may have value for DUI treatment programs in identifying individuals with a higher risk of recidivating. These individuals might benefit from extra program requirements or additional

program resources. However, it is questionable whether the study results are sufficiently positive to justify the use by the DMV of the identified predictive factors in taking licensing actions.

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